Claims

1. A biosensor, comprising a multitude of identical or different ligand-anchor-conjugates for generating a biospecific boundary layer on the sensor surface, which are available via combination of an anchor molecule with one or several ligands, the anchor molecule comprising at least one structural unit X which is capable of immobilizing the anchor on the surface, as well as at least one structural unit R, which enables the formation of a self-assembled monolayer on the surface and is terminally functionalized by a group A for binding to a ligand or a non-ligand.

2. The sensor according to claim 1, additionally comprising anchor molecules exclusively combined with non-ligands.

3. The sensor according to claim 1 or 2, comprising a surface fully or partially formed by gold, silver, palladium or platinum.

4. The sensor according to any of claims 1 to 3, comprising a surface including an array of positionally addressable fields on which the ligand anchor conjugates are immobilized.

5. The sensor according to claim 4, wherein the fields are localized in cavities on the sensor surface.

6. The sensor according to claim 4 or 5 comprising a base material (4) on the surface of which is provided a metallic coating (3) which in turn is covered by a protective layer (1), wherein at least a cavity (6) is formed within the protective layer (1) and the metallic layer (3), the cavity being trough-shaped in the area of the metallic layer (3) and provided with a carrier layer (2) and tapered in the direction of the trough in the area of the protective layer (1), wherein the lower edge of the cavity area provided within the protective layer (1) has a smaller diameter than the upper edge of the cavity area provided within the metallic layer (3).

7. The sensor according to any of claims 4 to 6, wherein the ligand–anchor conjugates immobilized on the fields form a molecular library in which the ligands used differ between the respective fields.

8. An anchor molecule for generating a biospecific boundary layer on a surface, comprising at least one structural unit X, which is capable of immobilizing the anchor on the surface, as well as at least one structural unit R, which enables the formation of a self-assembled monolayer on the surface and is terminally functionalized by a group A for binding to a ligand or a non-ligand.

9. The anchor molecule according to claim 8, wherein R is a branched or unbranched, optionally substituted, saturated or partially unsaturated hydrocarbon chain which may be interrupted by heteroatoms, aromatic or heterocyclic units and comprises 2-2000 atoms.

10. The anchor molecule according to claim 8 or 9, wherein R comprises a hydrophobic structural unit R^1 which is formed by a branched or unbranched hydrocarbon chain of 1 to 50 carbon atoms which may be saturated or partially unsaturated.

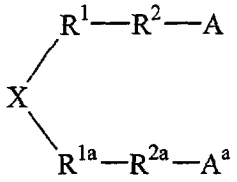
11. The anchor molecule according to any of claims 8 to 10, wherein R comprises a branched or unbranched hydrophilic spacer R^2 which is formed by a hydrocarbon chain, which is interrupted by heteroatoms and comprises 2 to 1000 carbon atoms.

12. The anchor molecule according to any of claims 8 to 11, wherein the structural element X comprises at least one element of main group V or VI of the periodic table.

13. The anchor molecule according to claim 12, wherein X is a disulfide, thiol or sulfide group.

14. The anchor molecule according to any of claims 8 to 13, wherein A is a hydroxyl, amino or carboxyl group.

15. The anchor molecule according to any of claims 8 to 14, having the following general structure



wherein R^1 and R^{1a} are independently defined as R^1 in claim 10;
R^2 and R^{2a} are independently defined as R^2 in claim 11;
the groups A and A^a are independently defined as A in claim 14; and
X is defined as in claim 13;
and wherein one or two structural units arbitrarily selected from R^{1a}, R^{2a} and A^a are optionally not present or the combination of R^{1a}, R^{2a} and A^a may completely be replaced by a hydrogen atom.

16. The anchor molecule according to any of claims 10 to 15, wherein R^1 and optionally R^{1a} have the structure $-(CH_2)_n-$, n being an integer from 1 to 50.

17. The anchor molecule according to any of claims 11 to 16, wherein R^2 and optionally R^{2a} are independently an oligoamide and/or oligoether group.

18. The anchor molecule according to any of claims 8 to 17, additionally comprising a functional group Y, which results from the linkage of the anchor molecule to a solid phase.

19. The anchor molecule according to claim 18, wherein Y is a carboxylic acid, carboxylic ester, carboxamide, aldehyde, hydrazide, hydroxamic acid, hydroxy, hydroxyalkyl or diketopiperazyl group.

20. A ligand-anchor conjugate, comprising an anchor molecule according to any of claims 8 to 19, which is terminally bound to at least one ligand that is capable of specifically interacting with a receptor.

21. The ligand-anchor conjugate according to claim 20, wherein the ligand is selected from the group consisting of a protein, peptide, oligonucleotide, carbohydrate, isoprenoide, enzyme, lipid structure, saccharide, antibody, peptide hormone, cytokine, antibiotic, or an organic molecule having a molecular weight ≥ 50 g/mol.

22. The ligand-anchor conjugate according to claim 20, wherein a non-ligand is additionally bound to the anchor molecule.

23. A method for the production of a ligand-anchor conjugate, comprising:

a) immobilisation or synthesis of an anchor molecule on a solid phase which is suitable for chemical synthesis;

b) synthesis of a ligand on an anchor molecule or binding of a ligand to the anchor molecule; and

c) cleavage of the formed ligand-anchor conjugate from the solid phase,

wherein the anchor molecule comprises at least one structural unit which is capable of immobilizing the ligand-anchor conjugate on a surface, as well as at least one structural unit which enables the formation of a self-assembled monolayer on the surface, and which is terminally functionalized for binding with a ligand or a non-ligand,
and wherein the ligand should allow interaction of the surface with a receptor.

24. The method according to claim 23, wherein a multitude of different ligand-anchor conjugates is generated using combinatorial methods for ligand synthesis.

25. The method according to claim 23 or 24, wherein the solid phase used for synthesis is a synthesis resin, a synthesis polymer film or a silicon or silicate surface.

26. The method according to claim 25, wherein the solid phase is a synthesis resin, selected from a hydroxy resin, an amino resin, a trityl resin, a dihydropyrane resin, a carboxy resin or an arylsiloxy resin.

27. A method for providing a biospecific boundary layer on a surface, comprising the production of ligand-anchor conjugates according to any of claims 20 to 24 and

additionally the step of contacting the obtained ligand-anchor conjugates with the surface.

28. A method for the production of a sensor according to any of claims 4 to 7, wherein a solution of the ligand is applied in a defined manner on spatially separate sections of the sensor surface.

29. Method according to claim 28 wherein the solution is applied by means of a pipetting device, a drop spot device, a micropipetting device or an ink jet method.

30. A method for detecting an interaction between ligands and receptors, comprising the step of contacting the receptors with a sensor according to any of claims 1 to 7.

31. The method according to claim 30, additionally comprising the step of measuring a mass increase at the sensor surface by means of SPR.

32. The method according to claim 30 or 31, wherein the sensor interacts with one or more receptors selected from proteins, DNA, RNA, oligonucleotides, prosthetic groups, vitamins, lipids, mono-, oligo- or polysaccharides or fusion proteins or synthesized primers.

33. Use of a sensor according to any of claims 1 to 7 in medical diagnosis.

34. Use of a sensor according to any of claims 1 to 7 for interaction analysis, in screening methods or in affinity chromatography.